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L11: Entry 1 of 1

File: USPT

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DOCUMENT-IDENTIFIER: US 5637925 A

TITLE: Uses of uniaxially electrically conductive articles

Brief Summary Text (19):

Any electrically insulating sheet material may be used in which the required pattern of through-holes can be formed with sufficient precision, preferred polymeric materials including those acceptable to the electronics industry, for examples epoxies, polyurethanes, polyimides, silicone rubbers, polysulphones and polycarbonates. The sheet may carry an adhesive layer on one or both of its surfaces if desired for its intended end use. A preferred laminar sheet of polyimide with surface layers of aromatic or amorphous polyamide is described in copending International Patent Application . . . (RK362COM), the disclosure of which is incorporated herein by reference. The preferred polyimide for this and other aspects of the present invention is one which is capable of retaining at least 50%, preferably at least 75%, more preferably at least 85%, of its original elongation after immersion in water of pH 10 at 100.degree. C. for four days according to ATSM D882. It will be readily understood that a sufficiently fully cyclised polyimide having less than 15%, preferably less than 10%, more preferably less than 5%, and if possible, substantially no open imide rings or uncyclised amic acid groupings maybe better able to survive hot alkaline metal plating baths, which attack incompletely cyclised polyimides such as Kapton (TM). Preferred materials include polyimides derived from polymerisation of 4,4'-biphenyl dianhydride and (4,4'-diaminobiphenyl, or 4,4'-diaminobiphenylether or phenylenediamine). The polyimide of 4,4'-diaminobiphenyl may provide thermal characteristics which are especially well suited to microcircuit applications. Corresponding polymers using the 4,3'- or 3,3'-isomers of the above three diamines and/or using pyromellitic dianhydride instead of the biphenyldianhydride (but excluding Kapton, of course) may also be useful. The currently more preferred commercially available polyimides are those available under the Trade Mark "UPILEX" from Ube/ICI. One of these, "UPILEX R", is believed to be a relatively completely cyclised polymer having a repeat unit derived from biphenyl dianhydride and diaminodiphenylether, viz. ##STR1##

Brief Summary Text (26):

1 Nuclear track etching: The polymeric sheet is exposed, through a mask corresponding to the desired pattern of through-holes, to high energy ion bombardment, either from a nuclear reactor or a high energy particle accelerator, and afterwards etched in a suitable solution. The damage tracks formed by the ions then show up as tubular through-holes in the sheet. Tubular through-holes with a hole diameter of 0.1 to 50 micrometres are easily drilled through 5 to 1000 micrometre sheets of e.g. polycarbonate or polyimide.